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A METHOD AND TECHNIQUE FOR CODLING MOTH TOXICOLOGICAL

STUDIES FOR FIELD AND LABORATORY USE,

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In an endeavor to reduce the losses occasioned by the codling moth, many insecticide tests have been made both in the field and in the laboratory.

In the field, the usual practice has been to lay out plats in apple orchards and to spray them in accord with a pre-determined program. The drop fruit has been examined throughout the season and the harvested fruit inspected as soon as picked.

In the laboratory insecticide tests, most of the studies have been confined to the spraying of picked apples on which were placed newly hatched codling moth larvae.

Under the conditions which obtain in the field, some of our data were unavoidably disappointing and at times misleading. Although the work was usually well planned and executed, the results frequently failed to indicate with scientific accuracy some of the primary objects of the experimentation, namely, the comparative value of the insecticides and the merits of different spray schedules.

The heterogeneity of plats, as influenced by initial differences of the insect population, and subsequent variations because of moth migration, proximity to abnormal sources of infestation, natural enemies and crop yield variants, has largely been responsible for most of the discordant data.

Other objectionable features of the field methods heretofore used, including some which have contributed to field heterogeneity, may be specified as follows:

- (1)--- Necessity of repeating the same tests annually over a considerable period.
- (2)--- Necessity of using large plats.
- (3)--- Loss of a season's work when insect infestation was very light.
- (4)--- Examination and inclusion of drop fruit with its somewhat questionable contributory value.



- (5)-- The rush of taking harvest results and consequent chances for inaccuracies.
- (6)-- Variance because of blemished fruit, as scab cracked, frost pitted, curculio and hail marked.
- (7)-- Lack of timely data as to when fruit is inadequately protected by spray material.
- (8)-- Lack of data on effect of removal of spray material by unusually heavy rains.

The method and technique suggested in this memorandum will not serve as a panacea, but it is thought that their employment will aid in eliminating many of the objections cited against our present experimental practices. The ideal sought is to preserve the natural environmental factors as far as possible. With respect to the fruit and spray coverage, this is accomplished fairly well up to the time the sample apples are removed for the comparative toxicological studies.

The plan of using the field method herein proposed for non-volatile sprays is briefly as follows:

- (1)-- Lay out the plats in the usual way, except on a smaller scale.
- (2)-- Spray in the usual way and in accord with the customary schedules.
- (3)-- Provide an ample supply of codling moth material for rearing purposes.
- (4)-- At stated intervals throughout the season, visit experimental plats and remove sample apples from lower, middle and upper sections of the count trees. Plug the fruit while in the field and bring to laboratory in special carrying vials to avoid rubbing of sprayed surface.
- (5)-- At laboratory, seal each apple plug in a vial provided for the purpose (7/8 inch inside diameter by 2 inches in length).
- (6)-- Place one newly hatched codling moth larva in each vial after apple plug has been properly sealed therein.
- (7)-- Examine in about 48 hours from the time the larva was placed in the vial.
- (8)-- Side, calyx and stem plugs from each plat should be tested. Four or more side plugs should be removed from each count apple when possible.







In the case of strictly laboratory tests, in which individual picked apples have been sprayed before placing on the larvae, the following objections are noted:

- (1)-- Difficulty in getting a very high or uniform infestation on the unsprayed fruit used as checks.
- (2)-- Difficulty in locating numerous larval entrances.
- (3)-- No check on larval cannibalism where more than one larva per apple has been used.
- (4)-- Differences in loss of insects because of dropping from fruit.
- (5)-- Difficulty of finding unblemished fruit for the tests.
- (6)-- Complications as a result of using a sticky material to prevent escape of the larvae from the suspended fruit.
- (7)-- Difficulty of making a uniform spray coverage on the apples.

It is believed that the method and technique herein suggested will reduce some of the objectionable features for our present practice.

The technique is shown in Figures I to 15 inclusive. It is thought that further explanation other than that given by the legends is unnecessary.

The reader may, however, question the necessity of sealing the apple plug first with paraffine and then with a film of calcium resinate. This need not be done if the vials are of uniform size and the plugs fit snugly. The film of calcium resinate is required, however, to prevent the larva from entering the fruit where it is in contact with the vial.

A further discussion of the details is omitted for the sake of brevity. The writer will be very glad to answer any inquiries received.

Finally, it is recognized that the use of these suggestions will entail considerable work, which, however, will be distributed throughout the season. The value of the results obtained will largely depend upon an adequate number of samples and the care exercised in the performance of the work.

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